

TOWARDS THE DEVELOPMENT OF THE
NEW ZEALAND HEARING IN NOISE TEST
(NZHINT)

A thesis submitted in partial fulfilment of the requirements for the
Degree
of Master of Audiology
at the University of Canterbury
by Ruth Veronica Hope
University of Canterbury
2010

Acknowledgements

I would like to acknowledge my supervisors Dr Margaret Maclagan and Paul Peryman for their assistance during the course of this thesis. Margaret's friendliness, efficiency, and practical, down-to-earth approach to research was greatly valued, as was her almost limitless availability despite her (in theory) part-time status. Paul's extensive knowledge and experience, enthusiasm for the subject and willingness to discuss ideas and find articles to back them up was a source of much inspiration.

I am grateful to Dr Sig Soli, Andy Vermiglio, Dan Freed and Justin Aranoff of House Ear Institute, for all their input, technical support and advice.

Dr Greg O'Beirne wrote me a programme at a moment's notice, found me a mixer and cables, and didn't even grimace when I turned up on his office doorstep for the umpteenth time in a week, all of which I appreciated tremendously. Thanks also to Kieran Shaw, who spent a frustrating hour with a stressed audiology student and a Head and Torso Simulator, and dealt admirably with both. A special thank you to Dr Natalie Rickard who, when disaster struck, let me borrow for an hour the laptop she was working on.

To my fellow MAud students of the class of 2010 – Katrine Alchin, Virginia Good, Uta Heidtke, Catherine Kalin, Katrina Light, Wanita Lynn, Pip Wilding and Phil Winter – thank you for the walks, coffees, discussions and dessert nights. I am especially indebted to Katrina, who was so very efficient at finding participants for me, and Phil, who helped out in testing and occasionally was forced to play secretary and entertain the next participant while I finished with the previous one.

I also acknowledge the time and effort put in by my participants, some of whom even volunteered themselves without too much arm-twisting.

I thank Helen Bones and Jeremy Thin for their superior proof-reading skills and amusing comments.

This thesis is dedicated to my friends and family for all their unwavering love and support throughout my years of study, and to my dear husband Jeremy for technical assistance, tasty treats and stepping in when the going got tough.

Abstract

The ability to understand speech in noise has a profound impact on everyday communication, but cannot be predicted on the basis of puretone thresholds and/or performance on tests of speech in quiet. The aim of this thesis was to develop an adaptive speech in noise test based on the Hearing in Noise Test (HINT) that would be reliable and valid for speakers of New Zealand English (NZE). The methodology used followed the standard procedures for developing the HINT in a new language. Five hundred sentences of 5-7 syllables were collected from New Zealand children's books and recorded by a native NZE speaker. Nine normal-hearing native NZE speakers aged 18-50 listened to three sets of 50 sentences at -2, -4 and -7 dB signal-to-noise ratios (SNR) in order to establish a performance-intensity (PI) function for these sentences. Three groups of 10 participants were scored on their performance on the sentences in 65 dBA speech-weighted noise at varying SNR. After each round of testing with a new group of participants, the SNR of each sentence was adjusted in order to get closer to 70% intelligibility for all sentences. Sentences that were too easy or difficult or did not respond to adjustments were discarded. Once the remaining 240 sentences were of approximately equal intelligibility, 24 phonemically matched lists of 10 sentences were formed and tested on 12 participants using the adaptive HINT software. The overall mean threshold was calculated as -6 dB, s.d.=1.1 dB. The lists were combined to form 12 lists of 20 sentences which would become the NZHINT. Time delays meant that the collection of normative data could not be completed.

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Abbreviations

AmE	American English
BM	Basilar membrane
CF	Characteristic frequency
COSI	Client Oriented Scale of Improvement
CST	Connected Speech Test
CUNY	City University of New York
dB	decibels
HEI	House Ear Institute
HI	Hearing impaired
HINT	Hearing in Noise Test
HL	Hearing level
Hz	Hertz
IHC	Inner hair cells
NH	Normal hearing
NU-6	North-Western University Auditory Test Number 6
OHC	Outer hair cells
ONZE	Origins of New Zealand English Project
PEST	Parameter estimation by sequential testing
PH	High predictability
PL	Low predictability
PI	Performance-Intensity
PTA	Puretone average
QuickSIN	Quick Speech in Noise
RMS	root-mean-square
SCAN	Screening test for Auditory Processing Disorder
SL	Sensation Level
SNHL	Sensorineural hearing loss
SNR	Signal-to-noise ratio
SPIN	Speech Perception in Noise
SRT	Speech Reception Threshold
WIN	Words in Noise
NZE	New Zealand English
NZHINT	New Zealand Hearing in Noise Test